



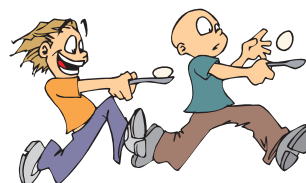
SILVER LEVEL CHALLENGE #1



Calculators may NOT be used.

Name _____

1. **Danny** Five people competed in an egg race. Cliff finished directly behind Danny, and there were two people who finished between Cliff and Mark. Mark finished after Eric, but before Tom. There were no ties. Which of the five people finished fourth in the race?



Let's only use the first letter of each person's name, and we'll always put the winning person first in our list. Since C finished directly behind D, we know we have D, C somewhere in our final order. Since two people finished between C and M, we either have M, __, D, C or we have D, C, __, __, M. Notice this second order uses all five people, so M would be last. However, we're told T finished after M (and E finished before M). So the final order must be E, M, T, D, C. From this we see D, or **Danny**, finished fourth.

2. **15** feet The marble statue of Abraham Lincoln in the Lincoln Memorial has a height of 60 feet. A scale model of the statue has a height of 4 inches. How many feet of the statue does one inch of the model represent?

The entire model is 4 inches tall, and we are asked to consider 1 inch of the model. This is $\frac{1}{4}$ of the model. This then corresponds to $\frac{1}{4}$ of the marble statue, which would be $(\frac{1}{4})(60 \text{ feet}) = \mathbf{15}$ feet.

3. **37** What is the value of $9 - 8 + 7 \times 6 + 5 - 4 \times 3 + 2 - 1$?

Because of the Order of Operations, the expression is equivalent to $9 - 8 + (7 \times 6) + 5 - (4 \times 3) + 2 - 1$, which is $9 - 8 + (42) + 5 - (12) + 2 - 1$. Contrary to what many people think, addition does not "come before" subtraction in the Order of Operations. They are "equally-weighted operations," and they are done in the order they appear in the expression. So we now have $9 - 8 = 1$, and $1 + (42) = 43$, and $43 + 5 = 48$, and $48 - 12 = 36$, and $36 + 2 = 38$ and finally, $38 - 1 = \mathbf{37}$.

4. 21 dollars
and thieves When several thieves tried to divide a sum of money by giving \$4 to each thief, one thief received nothing. When each thief took \$3, they had \$1 left over. What is the sum of the number of dollars and the number of thieves?



Let's assume we have T thieves. From the first sentence, we know there must be $4(T - 1)$ dollars. From second sentence, we know there must be $3T + 1$ dollars. Since these amounts must be equal, we have $4(T - 1) = 3T + 1$. Simplifying the left side of the equation gives us $4T - 4 = 3T + 1$. Subtracting $3T$ and adding 4 to each side results in $T = 5$. So there are 5 thieves, and $3(5) + 1 = \$16$. The sum of these values is $5 + 16 = \mathbf{21}$.

5. 18 rect How many rectangles are in the array below? (There are more than six!)



Let's start counting the smallest rectangles first. There are 6 "unit rectangles" that are 1 down by 1 across. Now let's count the 1 down by 2 across and 2 down by 1 across rectangles... there are 4 and 3, respectively, for a total of 7. Now let's count the 1 down by 3 across rectangles... there are 2 of these. Are there any more? Yes, we still have the 2 down by 2 across, and there are 2 of these. Finally, we can see 1 rectangle that is 2 down by 3 across. This is a total of $6 + 7 + 2 + 2 + 1 = \mathbf{18}$ rectangles.